

(51) International Patent Classification⁶:

H01J 7/24, H01K 1/58, F21V 29/00

A1

(11) International Publication Number:

WO 96/07193

(43) International Publication Date:

7 March 1996 (07.03.96)

(21) International Application Number: PCT/IB95/00629

(22) International Filing Date: 10 August 1995 (10.08.95)

(30) Priority Data:

94202466.2 26 August 1994 (26.08.94) EP

(34) Countries for which the regional or international application was filed: NL et al.

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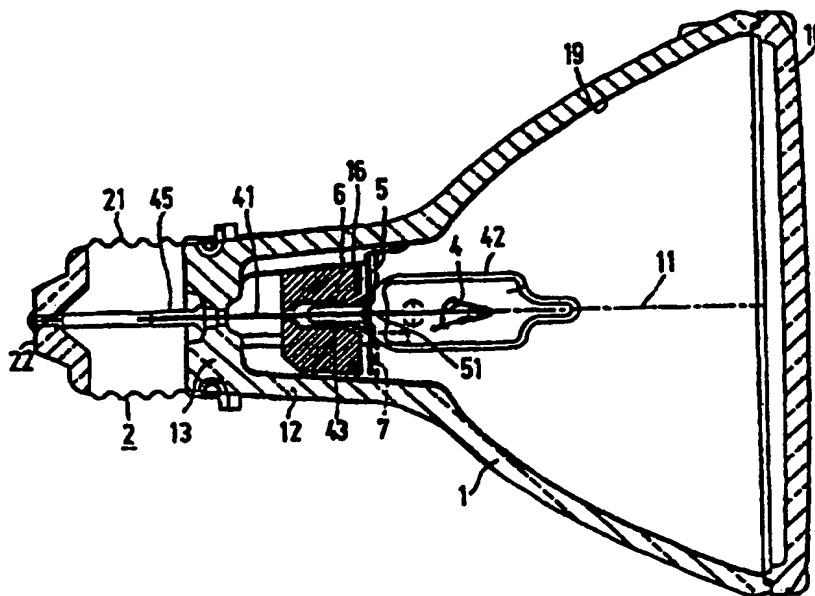
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(81) Designated States: CN, JP, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published

With international search report.

(54) Title: ELECTRIC REFLECTOR LAMP



(57) Abstract

The electric reflector lamp has a moulded reflector body (1) having an optical axis (11). A neck (12) is present around the axis. A light source (4) is disposed in the reflector body, enveloped by a lamp vessel (42) which has a seal (43). A metal mounting member (5) through which the seal (43) extends is present in the neck (12). The lamp has a ceramic body (6) which surrounds the seal (43) to lower the temperature during operation thereof. A mirroring disk (7) may be present between the lamp vessel (42) and the mounting member (5) to reflect radiation away from the seal (43).

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Electric reflector lamp.

The invention relates to an electric reflector lamp comprising:
a hollow moulded reflector body with an optical axis and a neck
surrounding said optical axis;

a lamp cap provided with contacts and connected to the neck;

5 a light source which is arranged in the reflector body, is electrically
connected to the contacts of the lamp cap by means of current conductors, and is
accommodated in a lamp vessel having a seal;

a metal mounting member in the neck which holds the lamp vessel and
through which said seal of the lamp vessel is passed.

10

Such a reflector lamp is known from EP-A 0 543 448 (PHN 13.900).

The reflector body in the known reflector lamp is integral with the neck.
The neck has a seat on which the mounting member bears. The mounting member is a plate
through which the seal is passed and which has resilient tags which hold the seal of the lamp
15 vessel with clamping force. The current conductors are fastened to a bottom of the neck
under tension. Because of the thermal load and the ease of its manufacture, the reflector
body is usually made of glass.

US-A 5 281 889 discloses a reflector lamp whose neck is bipartite. The
mounting member, again a plate with resilient tags which hold the seal with clamping force,
20 is enclosed between the two parts of the neck.

US-A 4 829 210 discloses a reflector lamp whose mounting member is a
similar plate with resilient tags, but this plate has a flanged rim subdivided into resilient tags
which rest with clamping force in the neck of the reflector body.

Such reflector lamps may be used as substitutes for incandescent lamps
25 with blown glass bulbs for general lighting purposes or for such lamps having reflectorized
blown bulbs. The reflector lamps may be operated at mains voltage and have Edison or
bayonet caps. The intended application of the lamps implies that they must fit in conventional
luminaires and that their necks must thus be comparatively long, corresponding to those of
said lamps having blown bulbs.

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The known reflector lamps have the advantage over conventional

incandescent lamps that the light source is enclosed in an inner lamp vessel, and can thus have a higher brightness and a higher luminous efficacy, and can be more compact. As a result, the generated light can be shaped into a beam of comparatively high intensity in the centre thereof by the reflector body.

5 A disadvantage of these reflector lamps is, however, that the seal of the lamp vessel held by the mounting member assumes a comparatively high temperature during operation, although this seal is surrounded by a space inside the neck and in the direction of the lamp cap. The mounting member, however, closes off the space in the neck substantially from the space in the reflector body. A comparatively high temperature of said seal may
10 limit lamp life. The current conductors in said seal may in fact oxidize comparatively quickly then, so that they cause the seal to crack.

 It is an object of the invention to provide an electric reflector lamp of the kind mentioned in the opening paragraph whose lamp vessel seal has a comparatively low
15 temperature during operation.

 According to the invention, this object is achieved in that a ceramic body surrounding said seal of the lamp vessel is present in the neck.

 It was found that the ceramic body leads to a major reduction in the temperature of the seal. This is quite remarkable in view of the fact that no narrow fits can
20 be realised with ceramic bodies. The manufacture of ceramic bodies involves variations in their dimensions. The neck of the reflector body and the lamp vessel seal are also subject to variations in their dimensions. Ceramic material is rigid, not ductile, so that it cannot adapt itself to its surroundings. Even if the reflector body, the seal, and the ceramic body are
25 manufactured with great care, they will generally not be in contact with one another everywhere around the optical axis, and interstices will exist at least locally. Nevertheless, the seal is found to have a lower temperature, i.e. there is an increased heat transfer from the seal to the surroundings thereof through the ceramic body at the neck compared with the situation in which said ceramic body is absent.

 However, it is favourable when the ceramic body has a cavity for
30 accommodating the seal with a shape which corresponds to the shape of the seal. The body can then closely surround the seal.

 In a favourable embodiment, the ceramic body has a wall facing towards the lamp cap and transverse to the optical axis, in which wall a respective opening is provided for each current conductor.

In a special embodiment, the reflector lamp has a mirroring disc between the lamp vessel and the mounting member. The disc may be made, for example, of anodized aluminium. The advantage of this is that radiation from the light source is more strongly reflected, so that less heat is transferred to the lamp vessel seal. The material of the metal mounting member is in fact chosen on the basis of its mechanical properties, such as its resilience, rather than on the basis of its reflectivity during use at elevated temperature. The mounting member is made, for example, of stainless steel or German silver.

The reflector body may be moulded from glass, or may be formed from synthetic resin by, for example, pressing, casting, or injection-moulding. The reflector body may be closed off with a cover in the finished lamp, fastened thereto, for example, with cement. Pollution of the reflector may be counteracted thereby. The cover may alternatively have an optical function as well, for example, a beam-forming or smoothing function. A cover reduces the cooling of the lamp during operation, so that the measure in the lamp according to the invention is the more useful in the presence of a cover.

The lamp cap may be fastened to the reflector body in a conventional manner with, for example, glue or cement. In an attractive embodiment, however, the neck has one or several depressions into which the lamp cap is indented. Such depressions may be readily obtained without special provisions in the mould in that the reflector body is indented when coming out of the mould, while it is still hot.

The light source may be, for example, an incandescent body in a gas comprising halogen, or a pair of electrodes in an ionizable gas such as, for example, metal halides, rare gas, and possibly mercury.

An embodiment of the electric reflector lamp is shown in the drawing, in which

Fig. 1 shows a lamp in axial section;

Fig. 2 shows the lamp of Fig. 1 rotated through 40°, in axial section;

Fig. 3 shows the ceramic body as viewed in Fig. 2, on an enlarged scale;

Fig. 4 shows the ceramic body taken on the line IV in Fig. 3; and

Fig. 5 shows the ceramic body taken on the line V in Fig. 4.

In Figs. 1 and 2, the electric reflector lamp has a hollow moulded reflector body 1, moulded from glass in the Figures, with an optical axis 11 and a neck 12 surrounding the optical axis. The reflector body has a mirror coating, for example internally,

for example a vapour-deposited aluminium or silver layer 19, or alternatively an interference mirror. The reflecting surface is smoothly curved. Alternatively, however, it may be faceted or, for example, subdivided into axial lanes. The reflector body 1 shown is closed off with a cover 10, for example made of pressed glass, for example fixed with cement. A lamp cap 2, here an Edison lamp cap, is provided with contacts 21, 22 and connected to the neck. A light source 4 is arranged in the reflector body and electrically connected to the contacts of the lamp cap 2 by means of current conductors 41. The light source, an incandescent body in the Figures, is accommodated in a lamp vessel 42, for example made of quartz glass, which has a seal 43, for example a pinch seal, and which is filled with, for example, a rare gas and hydrogen bromide. In the neck 12 there is a metal mounting member 5 through which said lamp vessel seal 43 is passed and which holds the lamp vessel with resilient tags 51.

In the embodiment drawn, the neck 12 has a seat 16 on which the mounting member rests and which is formed by ridges in the neck. The current conductors 41 are fastened to a bottom 13 of the neck 12 under tension, in the Figures in that they are fixed in respective bushes 45, these bushes bearing on the bottom 13 on the side thereof facing towards the lamp cap 2. Safety fuses 44 are incorporated in the current conductors 4.

A ceramic body 6 which surrounds said seal 43 of the lamp vessel 42 is present in the neck 12.

A mirroring disc 7, for example made of aluminium, is indicated with a broken line as a component which may or may not be present.

In Figs. 3-5, the ceramic body 6, for example made of steatite, aluminium oxide, aluminium nitride, has a conical outer contour 61 so as to correspond to the inner shape of the neck 12. The inner contour 62 is slightly conical so as to disengage itself from the mould in which the body is formed. A wall 63 facing towards the lamp cap 2 (Fig. 2) has openings 64 for respective current conductors 41. The outer shell 61 has recesses 65 for accommodating ridges which form the seat 16 (Fig. 1) for the mounting member 5. The cavity 66 is destined for accommodating the seal of a lamp vessel.

A reflector lamp provided with a lamp vessel with an incandescent body of 75 W when operated at mains voltage was manufactured with a ceramic body comprising a cylindrical cavity for the lamp vessel seal which is rectangular in cross-section. A similar lamp had a ceramic body with a narrow rectangular cavity for the seal. For comparison, the lamp was also made without a ceramic body, and also without such a body but with a mirroring disc. The temperatures of the seal during lamp operation were measured and listed in Table 1.

Table 1

ceramic body	disc	temp. °C
—	—	377*
—	+	369*
cylindrical cavity	—	235
rectangular cavity	—	184

* not according to the invention

It appears from this Table that a mirroring body reduces the temperature only slightly. The ceramic body with cylindrical cavity, which accordingly surrounds the rectangular seal at a distance for the major part, nevertheless reduces the temperature by 142°C. The ceramic body with the rectangular cavity, which narrowly encloses the seal, leads to an additional temperature reduction of 51°C.

The reflector lamp was also manufactured with a lamp vessel covered with an IR-reflecting interference filter. The incandescent body in the lamp vessel consumed a power of no more than 68 W when operated at mains voltage. The lamp was manufactured with and without a ceramic body with a rectangular cavity, and also with a ceramic body and a mirroring disc. The temperatures of the seal during operation are given in Table 2.

Table 2

ceramic body	disc	temp. °C
—	—	583*
rectangular cavity	—	408
rectangular cavity	+	381

* not according to the invention

It is apparent from Table 2 that the ceramic body reduces the seal temperature, which is considerably higher than that in Table 1 owing to the filter, by 175°C, while the mirroring disc leads to an additional temperature reduction of 27°C.

CLAIMS:

1. An electric reflector lamp comprising:
a hollow moulded reflector body (1) with an optical axis (11) and a neck
(12) surrounding said optical axis;
a lamp cap (2) provided with contacts (21, 22) and connected to the neck;
5 a light source (4) which is arranged in the reflector body, is electrically
connected to the contacts of the lamp cap by means of current conductors (41), and is
accommodated in a lamp vessel (42) having a seal (43);
a metal mounting member (5) in the neck (12) which holds the lamp
vessel (42) and through which said seal (43) of the lamp vessel is passed,
10 characterized in that a ceramic body (6) surrounding said seal (43) of the
lamp vessel (42) is present in the neck (12).
2. An electric reflector lamp as claimed in Claim 1, characterized in that the
ceramic body (6) has a cavity (66) for accommodating the seal (43) whose shape corresponds
to the shape of the seal.
- 15 3. An electric reflector lamp as claimed in Claim 1 or 2, characterized in
that the ceramic body (6) has a wall (63) facing towards the lamp cap (2) and transverse to
the optical axis (11), in which wall a respective opening (64) is provided for each current
conductor (41).
4. An electric reflector lamp as claimed in Claim 1, 2 or 3, characterized in
20 that a mirroring disc (7) is present between the lamp vessel (42) and the mounting member
(5).

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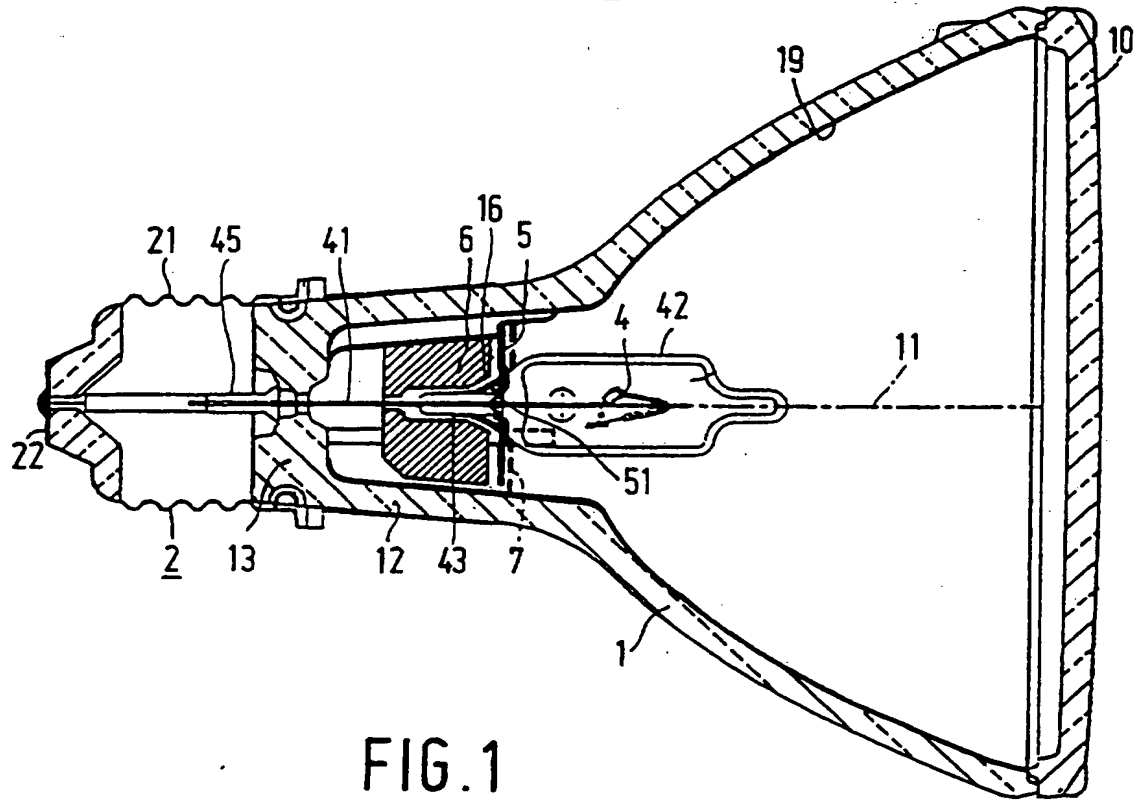


FIG. 1

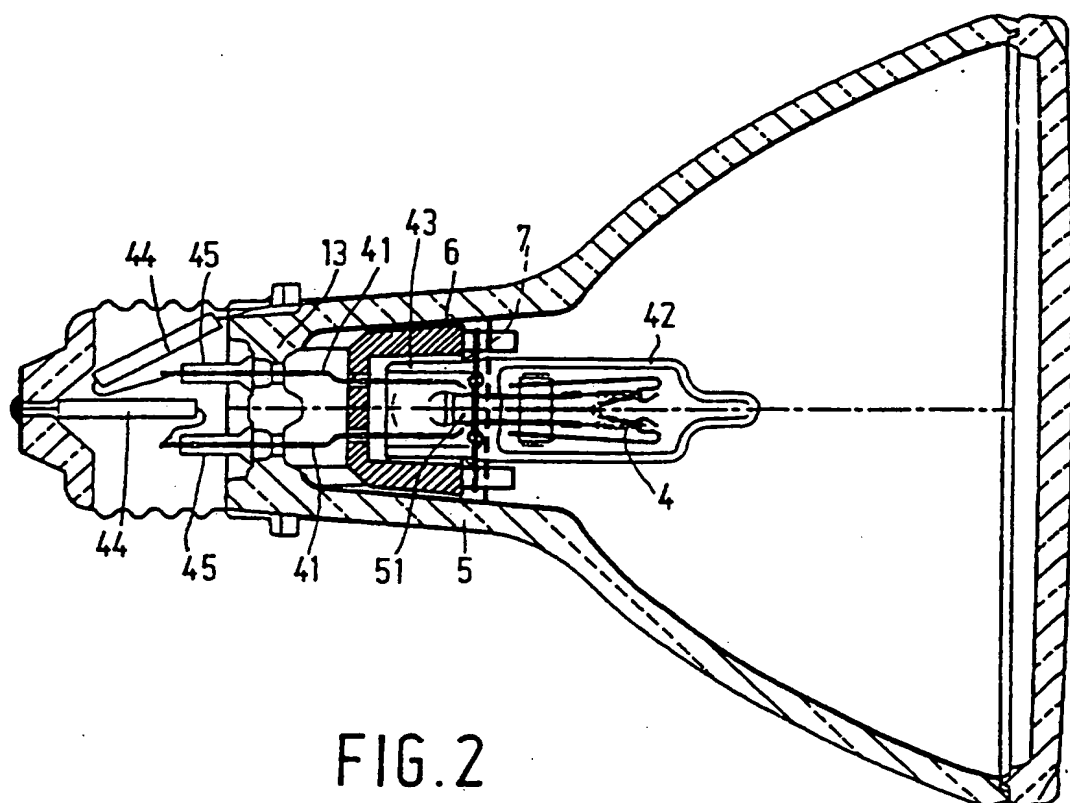


FIG. 2

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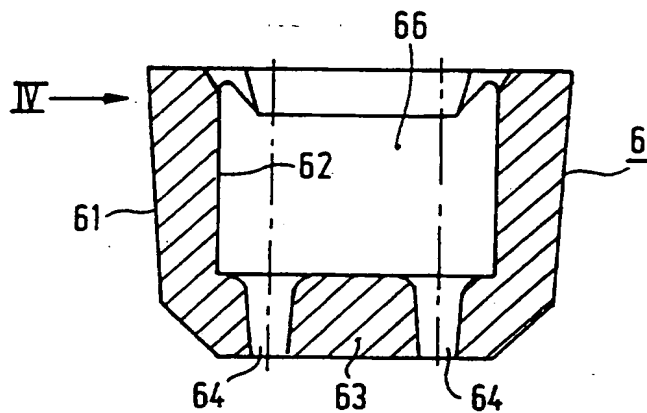


FIG. 3

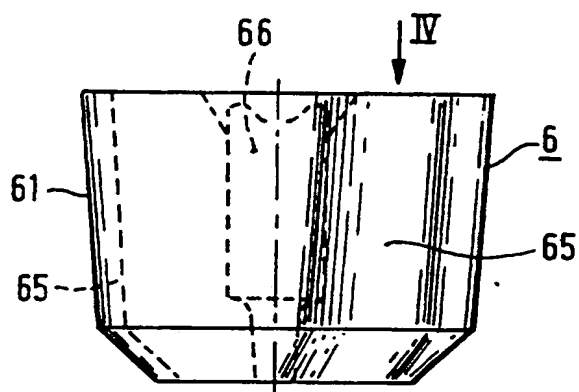


FIG. 4

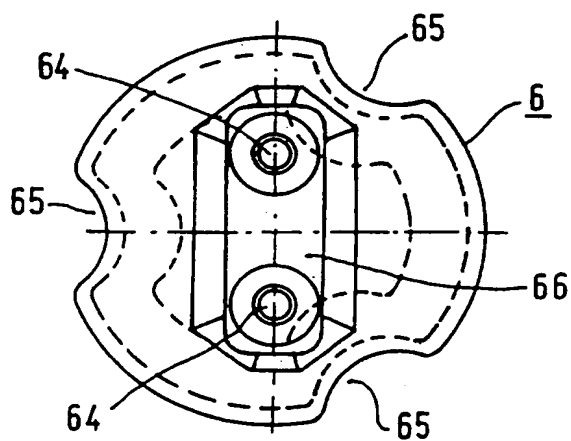


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB 95/00629

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H01J 7/24, H01K 1/58, F21V 29/00

According to International Patent Classification (IPC) or to both national classification and IPC

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Minimum documentation searched (classification system followed by classification symbols)

IPC6: H01J, H01K, F21V

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0434292 A2 (GENERAL ELECTRIC COMPANY), 26 June 1991 (26.06.91), column 8, line 37 - column 9, line 26, claim 1 --	1-4
Y	EP 0543448 A1 (N.V. PHILIPS'GLOEILAMPENFABRIEKEN), 26 May 1993 (26.05.93), figure 1, claims 1 and 5 -- -----	1-4

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Date of the actual completion of the international search

7 December 1995

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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International application No.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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